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## REMARKS

In view of the above amendments and following remarks, reexamination and reconsideration are respectfully requested.

By this Amendment, claims 37-48 have been canceled and claims 49-67 have been newly added. Accordingly, it is submitted that claims 49-67 are currently pending in this application.

It is submitted that claims 49-61 and 65-67 have been drafted so as to avoid being interpreted as means/step-plus-function type claims under 35 U.S.C. § 112, sixth paragraph.

Next, it is noted that the Examiner has required drawing Figures 1 and 2 to be amended so as to include descriptive legends for each of the elements. Accordingly, concurrently submitted herewith is a Proposed Drawing Amendment with Figures 1 and 2 marked in red to incorporate the descriptive legends as suggested by the Examiner. The Examiner's approval for such Proposed Drawing Amendments is respectfully requested. Further, enclosed herewith are corrected drawings incorporating the aforementioned proposed changes to the drawings along with a cover letter. Upon approval of the proposed changes, entry of the corrected drawings is respectfully requested.

Next, in order to aid the Examiner's further consideration of this application, the Specification has been reviewed and revised so as to make minor editorial changes so as to place the application in better condition. Accordingly, enclosed herewith is a Substitute Specification and a new Abstract, entry of which is respectfully requested. Also enclosed herewith is a marked-up version of the Specification and Abstract entitled "*Version with Markings to Show Changes Made*" which reflects the changes made therein. It is submitted that no new matter has been added.

Next, it is noted that the Examiner has rejected claims 37-48 under 35 U.S.C. § 112, second paragraph, for the reasons contained in paragraph 3 on page 2 of the Office Action.

It is noted that the Applicant has taken each of the Examiner's comments contained in paragraph 3 into consideration upon preparing and drafting new claims 49-67. Regarding the Examiner's assertion contained in paragraph 3 on page 2 of the Office Action that the phrase "the conscious perception threshold" lacks proper antecedent basis, it is noted that this phrase has been revised to "a human's conscious perception threshold" in the claims. It is submitted that the phrase

"a human's conscious perception threshold" can be readily understood by one having ordinary skill in the art of neuropsychology. Accordingly, it is submitted that each of the newly added claims clearly complies with the requirements of 35 U.S.C. § 112, second paragraph, and is in proper form.

Next, it is noted that the Examiner has rejected each of claims 37-48 under 35 U.S.C. § 102(e) as being anticipated by Lundberg (USPN: 5,738,527) for the reasons contained in paragraph 5 on pages 3-4 of the Office Action.

The Applicant respectfully traverses the Examiner's aforementioned rejection and submits that the present invention, at least as claimed in each of independent claims 49, 62, and 65, clearly patentably distinguishes over the Lundberg patent for at least the following reasons.

Initially, as context for the present application, it is first noted that a human being normally is able to easily learn contents when the human finds the particular contents to be interesting. On the other hand, when the human finds the particular contents to be rather uninteresting or boring, the human normally is reluctant to learn the contents and tends to quickly forget such contents [see page 1 of the specification].

In view of the foregoing description of human nature, an object of the present invention is to provide a learning system and method for displaying learning contents such that even the learning of learning contents which arouse little interest to a person is made easier. This is achieved in the present invention based upon the scientific finding that the brain of a human who is confronted with a visual presentation below the human's conscious perception threshold (i.e., the time information has to be presented to be consciously perceived by a human) is able to process and learn the visual presentation even though the person may never take conscious notice of the visual presentation.

Particularly, according to the present invention, the aforementioned objects and advantages are achieved by providing a learning system/method in which a visual presentation is caused to be displayed on a display screen for a predetermined introduction period of time, learning contents to be learned are called up from a learning material memory, and learning contents are introduced at changing locations in a region of the visual presentation on the display screen, wherein the predetermined introduction period of time is below a human's conscious perception threshold.

It is submitted that the above discussed features of the present invention are encompassed within the limitations of each of independent claims 49, 62, and 65 of the present application. Further, it is submitted that these claimed features are not disclosed, suggested, or rendered obvious by the Lundberg reference cited by the Examiner.

The Applicant notes that the Lundberg reference discloses a screen saver which displays questions and answers, and which keeps track of scores of users. Particularly, as shown in Figure 5, an exemplary display of the screen saver program is depicted where a question (50) is displayed along with two buttons which can be selected by a user with a mouse. A space (51) is provided on the display for the user to type in an answer [see column 3 (lines 6-11)]. The Applicant submits that it is clearly evident that, in order for a user to be able to answer the questions being displayed on the screen saver, the questions must be displayed for a period of time above the user's conscious perception threshold. As clearly stated in column 2 (line 67) - column 3 (line 3), the screen saver must continuously display questions followed by corresponding answers "for a suitable amount of time (for example, enough time for carefully reading the question plus some time to contemplate an answer, e.g., between 3 seconds and 3 minutes)."

From the foregoing, the Applicant strongly submits that the Lundberg reference fails to disclose, suggest, or render obvious a learning system/method in which a visual presentation is caused to be displayed on a display screen for a predetermined introduction period of time, learning contents to be learned are called up from a learning material memory, and learning contents are introduced at changing locations in a region of the visual presentation on the display screen, wherein the predetermined introduction period of time is below a human's conscious perception threshold, as claimed in each of independent claims 49, 62, and 65 of the present application.

It is submitted that the present invention, which displays learning contents in a manner such that the viewer does not notice or perceive that he/she is being presented with learning contents, is completely different and novel over the Lundberg system in which a screen saver system presents a view with a question which clearly has to be perceived and analyzed by the viewer in order to provide an answer to the question.

For at least the foregoing reasons, it is submitted that independent claims 49, 62, and 65, as well as claims 50-61, 63-64, and 66-67 dependent therefrom, clearly are allowable.

Accordingly, it is submitted that the present application now in fact clearly is in condition for allowance and the Examiner therefore is requested to pass this case to issue.

In the event, however that the Examiner has any comments or suggestions of a nature necessary to place this case in condition for allowance, then **the Examiner is kindly requested to contact Applicants' undersigned attorney by telephone to promptly resolve any such matters.**

Respectfully submitted,

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- 5 Learning system and method of learning learning contents as well as a program logic of a learning program

#### TECHNICAL FIELD OF THE INVENTION

The invention concerns a learning system for learning learning contents. The invention further concerns a method of learning learning contents and a program logic of a learning program.

BACKGROUND OF THE INVENTION  
A learning system in which learning contents are displayed on a display screen is known for example from US patent specification No:5,147, 205.

The principle applies in regard to any learning that a human being normally learns easily and well something in which he is really interested. However, if something does not interest a human being, then he learns it only reluctantly, and generally very slowly, and only in such a way that he does not really know it well, and he also quickly forgets it again. Nowadays, in regard to learning in a school context, there are some activities such as for example, spelling exercises, learning vocabulary, learning dates in history or learning formulae in chemistry, which many people do not like, and which they find tedious, and for which it is therefore probably difficult to arouse interest on the part of such people.

SUMMARY OF THE INVENTION  
The object of the invention is to provide a learning system, and also a method of learning, and a program logic of a learning system, whereby the learning of learning contents which arouse little interest is made easier.

In accordance with the invention that is achieved by a learning system having the features of claim 1 and by a method having the features of claim 4 and by a program logic having the features of claim 19.

In that respect the invention is based on the realization that the brain of a human being, if he looks at something which is of interest to

him, is opened up for the receipt of items of information. If at the same time something which is not interesting to him is also brought into play, that also penetrates well into the brain which is switched into a receiving mode, and it is therefore learnt more easily.

5 Desirably, the learning contents are played into or introduced into the visual presentation in small portions, wherein the individual introductions are effected at spacings from each other <sup>with</sup> ~~in~~ respect <sup>to</sup> of time and the introduction time of a learning content is substantially shorter than the time interval between two successive introductions of learning  
10 contents. For example, the introduction of the learning content can be into a computer game. For that purpose, the learning content is called up out of a learning material memory and the game program is briefly interrupted for introducing the learning content. After the interruption, the game program is resumed again until the next learning content is  
15 introduced. In that situation, because of the short length of the introductions of learning contents which can possibly be below the perception threshold, the interruptions in the game program are so short that playing of the game is not adversely affected. In that case, the learning content can be presented only during the interruption in the  
20 game or also while the game is continuing, if the game permits that.  
BRIEF DESCRIPTION OF THE DRAWINGS  
Further advantages and details of the invention are described hereinafter with reference to the accompanying drawing in which:

Figure 1 is a diagrammatic view of a learning system according to the invention,

25 Figure 2 is a further diagrammatic view of a learning system according to the invention, showing a learning program which is subdivided into various modules,

Figure 3 shows a flow chart of a learning content display module,

Figure 4 shows a flow chart of the checking program module, and

Figure 5 shows a flow chart of another embodiment of a learning program with a learning program module which is interwoven with the computer game program module.

DETAILED DESCRIPTION OF THE INVENTION

Referring to Figure 1, diagrammatically illustrated therein is a learning system according to the invention having means 21 which cause a visual presentation such as a computer game, a television film or a video game to run on a display screen 20. The visual presentation can be influenced by way of an input device 28 which, besides a keyboard, can also include a mouse and a joystick, and by way of means 24 for controlling the learning system. In that way, it is possible, for example, to select which visual presentation is to run, and given presetting values in respect of the visual presentation can be inputted. If the nature of the visual presentation permits it, ~~in that way~~ the running of the presentation can also be interactively influenced.

The learning contents to be learnt are stored in a learning material memory 26 and are called up out of same by means 25. Those called-up learning contents are played into or introduced into the visual presentation running on the display screen 20, by means 23. Preferably, while a learning content is being played on the display screen 20, running of the visual presentation is interrupted by means 22. Various modes of displaying the learning contents in a region of the visual presentation are described hereinafter with reference to Figure 2.

The learning system can be controlled in various ways ~~by way of~~ the input device 28 and the means 24. It is possible to alter the intervals between the individual introductions of a learning content by the means 23 and the duration of the display of a learning content on the display screen 20. It is possible to input which learning contents are called up out of the learning material memory by the means 25, and at what frequency. The learning contents in the learning material memory 26 can be processed and further learning contents can be introduced into the learning material memory 26 from a further memory 27, for example, a *such as*

hard disk drive or an interchangeable data carrier drive. The learning contents can also be called up from the learning material memory 26 in order to check the learning success.

The learning system diagrammatically illustrated in Figure 2 shows  
5 a learning program 1 which runs on a commercially available PC and communicates with various hardware components of the PC. A plurality of such hardware components which are of importance for the learning system are shown in Figure 2. They are an input device 2 in the form of a keyboard and/or mouse, a display screen 3, a permanent memory in the  
10 form of a hard disk drive 4, a further drive 5 for interchangeable media such as floppy disks or CD-ROMs. A learning material memory 6 is disposed in the main memory of the computer, while a part of that learning material memory can be taken out of store onto the hard disk drive 4 or the data carrier fitted into the further drive 5.

15 The learning program 1 includes a computer game program module 7, a learning content display module 8, a checking module 9, an editor program module 10, an input control module 11 and a control program 12 into which the specified program modules are embedded and which provides a graphic user interface on the display screen 3 for the input of  
20 parameters and for selection of one of the various program procedures.

The computer game program module 7 causes a computer game (which can be selected from a number of computer games) to run as a visual presentation on the display screen 3. The computer game can be operated by way of the input device 2. At given intervals which can be set  
25 by way of the graphic user interface of the control program, the learning content display module 8 or the control program 12 interrupts the running of the computer game by the computer game program module 7 and the learning content display module 8 introduces a learning content which is loaded from the learning material memory 6 into the visual presentation  
30 which is shown on the display screen (and which is momentarily stopped). The learning content introduction period can be selected by way of the

graphic user interface of the control program 12 and is preferably in a range which is shorter than 1 second and which is preferably shorter than 0.2 second and, if desired, can even be shorter than the conscious perception threshold for the learning content. After the learning content 5 introduction period has expired, the computer game program module 7 resumes continues the computer game until the next interruption takes place for the purposes of introducing a portion of learning content. The time interval between two successive operations of introducing learning contents can in turn be selected by way of the graphic user interface of 10 the control program 12 and is preferably substantially longer than the introduction period of an individual portion of learning content in order not to have an adverse effect on running of the computer game, in order not to prevent prevent to rob the computer game from being robbed of its character as a game, and in order to permit psychological processing of the individual learning contents by the 15 user. In the case of game programs which are suitable for that purpose, the displayed learning content can also still persist in the game as it continues.

Introduction of the learning content into the visual presentation displayed on the display screen can be implemented into a stationary area 20 which is always at the same location or which appears at respective various positions which are adapted to what is happening on the display screen, or into a moving area which follows a given event of the computer game. For that purpose, the computer game program module can be briefly interrupted and caused to run again a plurality of times in 25 succession by the learning content display module 8, in which case upon each interruption in the computer game program module by the learning content display module, the area for display of the learning content is displayed at a somewhat displaced location on the display screen so that overall the impression afforded is that of a moving area. The area can be 30 visible due to a frame and a filling color and, in that case, can be steady, or blinking, or invisible, the nature thereof can be selected by the user. The

learning content itself can be displayed in the area continuously (steadily) or in a blinking or flashing mode, in which respect "blinking" means repeated brief display and "flashing" means single very brief display. The flashing time of the learning content can be so short that it is beneath the perception threshold. The learning content can also be introduced in pixel-wise or <sup>VA</sup> letter-wise manner. The appearance of the introduced learning contents can be graphically configured by the user with the editor program module 10.

For the purposes of learning a foreign language, the learning contents are one or more words of that foreign language and they are introduced in the form of labelling on, or inscriptions applied to, objects present in the computer game. In order to achieve interactivity, those learning contents can also be displayed when the respective objects are clicked with the mouse pointer. In the case of learning systems of that kind, in the simplest embodiment, there is no need either for a specific learning material memory or an interruption in the game, because labelling and also display when clicking on objects can be parts of the game. If the necessary hardware is present, the learning contents can also be introduced acoustically in the form of speech.

Figure 3 shows a flow chart of an embodiment of a learning content display module, more specifically, <sup>and</sup> ~~in~~ <sup>shows</sup> a variant when the computer system used and the computer language employed do not permit time sharing. After the beginning of the program, the system time is loaded. In the first running of the program after the beginning of a new learning session, the learning content counter is set to zero and the program branches to the command "increment learning content counter by 1". Subsequently, the next learning content is loaded from the learning material memory 6 into a preparation memory or buffer (not shown in Figure 2) which is also implemented in the main memory of the computer. The repetition number associated with that learning content is ascertained from the learning card file described hereinafter and the repetition counter is set to

1. In the first running of the program, the spot counter which specifies how many spots were previously displayed on the display screen is also set to zero and the program therefore branches to the command "increment spot counter by 1". The learning content in the buffer is now displayed on the display screen. The present system time is stored in the variable "time of the last spot". If the repetition counter is less than the repetition number associated with the learning content, the repetition counter is incremented by 1 and the program is left; otherwise, the learning content counter is incremented by 1 and the next learning content is fetched from the learning material memory into the buffer, in which case the associated repetition number is ascertained from the learning card file. <sup>further</sup> In this case, moreover the repetition counter is set to 1 and, as the spot counter is now greater than zero, the program is left. On the next running of the program, the system time is again loaded. As the learning content counter is now greater than zero, the variable "time since the last spot" is ascertained ~~which is~~ and determined from the system time less the time of the last spot. If the time since the last spot is less than the spot spacing which is inputted by way of the graphic user interface of the control program, the program is left; otherwise, the spot counter is incremented by 1, the learning content is played onto the display screen from the buffer and the variable "time of the last spot" is set to the system time. Depending on whether the repetition counter is less than the repetition number associated with the present learning content, the repetition counter is incremented by 1 and the program is left or the learning content counter is incremented by 1 and the next learning content is fetched from the learning material memory into the buffer, in which case the associated repetition number is ascertained, the repetition counter is set to 1 and the program is left.

The commands relating to time control do not apply in regard to  
30. time-sharing versions.

By way of the checking program module 9, it is possible to check whether the learning person has correctly received the learning contents. For that purpose, the learning contents stored in the learning material memory 6 are desirably characterised as being stored in various learning 5 card file compartments or boxes. If the learning content which is called up by the checking program module is known, the learning content is further put into a learning card file compartment or box with a higher degree of knowledge, in which case the learning contents of the learning card file box with the highest degree of knowledge are no longer put onto 10 the display screen by the learning content display module. In addition, a given repetition number can be linked to each learning card file box. This is the number <sup>indicating</sup> as to how often a given learning content is <sup>to be</sup> displayed on the display screen in succession (or at what average frequency).

Figure 4 shows a flow chart of the checking program module. After 15 the start of the program, the form of presentation of the learning content and the form of the answer can be selected. In addition, the number of fresh attempts in the case of a wrong answer can be inputted. Finally, the learning card file compartment or box of the learning card file, which is to be checked, is also selected. If the program is not broken off or 20 terminated, a learning content is fetched from the learning material memory and presented in the selected form on the display screen. The repetition counter is set to 1. After input of the answer, the answer is monitored by the program. If the answer is wrong, further progress of the program depends on whether the repetition counter corresponds to 25 the repetition number. If that is not the case, the repetition counter is incremented by 1 and the answer can be inputted once again. If, on the other hand, the repetition counter is equal to the repetition number, the correct answer is displayed and, if the learning content is not already in the first compartment or box, the learning content is moved further 30 forwardly in the learning card file by one or more compartments or boxes ~~x~~(the associated algorithm can be established by the user) ~~x~~ and, if the

program is not terminated, the next learning content is fetched from the learning material memory. If the answer was correct, the further procedure with the program depends on whether the learning content was already in the last active compartment or box. If that was the case, the 5 learning content is stored in the latent memory which corresponds to the box with the highest degree of knowledge and from which no further introduction of the learning content into the computer game is implemented. Otherwise, the learning content is arranged in the learning card file <sup>*backward*</sup> ~~backwardly~~ by one box, that is to say it is put into the box with 10 the next higher degree of knowledge.

By way of the editor program module 10, it is possible for new learning contents to be inputted into the learning material memory or introduced from the data carrier in the hard disk drive 4 or the interchangeable data carrier drive 5 or for learning contents already 15 present in the learning material memory to be processed. It also enables graphic configuring of the learning contents. The inputs can be checked for correctness by way of the input checking module 11.

Figure 5 shows a part of the flow chart of a further embodiment of the learning program. In this case, as set forth hereinafter, a learning 20 content display module is interwoven with a computer game program. After a starting dialog in which, for example, the area of knowledge to be *learned* ~~learnt~~ and the computer game to be used is interrogated, the procedure involves querying whether the learning contents in the learning material 25 memory are to be processed and, if that is the case, the procedure returns to the starting dialog after processing of the learning material memory (by means of an editor program module). The procedure subsequently queries whether a knowledge checking operation is to be implemented. In that case, after implementation of the knowledge 30 checking operation (with a checking program module), the procedure reverts to the starting dialog. Finally, the procedure queries whether the

*started*  
game is to be ~~begun~~ and, in a negative case, it reverts to the starting dialog while in the positive case the game is initialized.

- Subsequently, the program of the computer game runs, *in which* ~~case~~ *and* the command "go to the subroutine learning content display (= spot)"
- 5 is distributed by way of the commands of the game program in such a way that this subroutine is called up at a spacing of approximately one second in each case. Another option would provide ~~that~~ the subroutine learning content display <sup>to be</sup> ~~is~~ called up by a time sharing command if the programming language of the computer game has such a command
- 10 available.

- Instead of a computer game, it would also be possible to play, on the display screen, other visual presentations such as, for example, a television film or a video game. Introduction of the learning contents as well as checking and editing of the learning contents can be effected in
- 15 that case in a similar manner by way of suitable hardware. An apparatus for introducing a subliminal message into a normal television picture is known for example from WO 94/26063.



## ABSTRACT

visually

A Learning system and method for displaying learning contents stored on a memory onto a display for facilitating easy learning by humans.

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